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PTO 2003-1014

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1. X Patent Document No. 57-15493
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Publication Date July 17, 1982
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WEST[Generate Collection](#)[Print](#)**Search Results - Record(s) 1 through 2 of 2 returned.**☐ 1. Document ID: JP 57115493 A

L1: Entry 1 of 2

File: JPAB

Jul 17, 1982

PUB-NO: JP357115493A

DOCUMENT-IDENTIFIER: JP 57115493 A

TITLE: ANTIOXIDANT FOR LUBRICATING OIL

PUBN-DATE: July 17, 1982

INVENTOR-INFORMATION:

NAME

COUNTRY

ISHII, TAMAKI

ASSIGNEE-INFORMATION:

NAME

COUNTRY

SUMITOMO CHEM CO LTD

APPL-NO: JP56000612

APPL-DATE: January 5, 1981

US-CL-CURRENT: 526/280

INT-CL (IPC): C10M 1/28; C09K 15/30

ABSTRACT:

PURPOSE: To antioxidant for a lubricating oil, consisting of a 2,2,4-trimethyl-1,2-dihydroquinoline polymer containing specific amounts of a dimeric component and monomeric component.

CONSTITUTION: 2,2,4-trimethyl-1,2-dihydroquinoline polymer containing 5wt% or more, preferably 25wt% or more, dimeric component and less than 10wt% monomeric component as an antioxidant, in an amount of usually 0.1∼10wt%, based on preferably a mineral oil-based lubricating oil, is added to the lubricating oil.

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Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWC
Draw Desc	Image										

☐ 2. Document ID: JP 57115493 A

L1: Entry 2 of 2

File: DWPI

Jul 17, 1982

DERWENT-ACC-NO: 1982-71267E

DERWENT-WEEK: 198234

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TITLE: Antioxidant for lubricating oil - comprising polymerised 2,2,4-tri:methyl-1,2- di:hydro-quinoline contg. dimer and monomer

PATENT-ASSIGNEE:

ASSIGNEE

CODE

SUMITOMO CHEM CO LTD

SUMO

PRIORITY-DATA: 1981JP-0000612 (January 5, 1981)

PATENT-FAMILY:

PUB-NO

PUB-DATE

LANGUAGE

PAGES

MAIN-IPC

JP 57115493 A

July 17, 1982

003

INT-CL (IPC): C09K 15/30; C10M 1/28

ABSTRACTED-PUB-NO: JP 57115493A

BASIC-ABSTRACT:

Antioxidant (I) for lubricating oil comprises polymerised 2,2,4-trimethyl-1,2-dihydroquinoline contg. at least 5 (50) wt.% dimer and less than 10 wt.% monomer.

(I) is pref. used in an amt. 0.1-10 wt.% (based on lubricating oil). Combined use with other antioxidants, abrasion-preventers, corrosion-preventers, viscosity index improvers, extreme pressure lubricants, etc. is possible.

(I) is useful as the antioxidant for working fluid, turbine oil, engine oil, gear oil, rolling oil, cutting oil, etc.

TITLE-TERMS: ANTIOXIDANT LUBRICATE OIL COMPRISE POLYMERISE TRI METHYL DI HYDRO QUINOLINE CONTAIN DIMER MONOMER

DERWENT-CLASS: E14 H07

CPI-CODES: E06-D02; H07-G01;

CHEMICAL-CODES:

Chemical Indexing M3 *01*

Fragmentation Code

D013 D014 D016 D019 D622 D699 M1 M116 M119 M210

M211 M240 M283 M320 M412 M512 M513 M520 M530 M540

M781 M903 Q416 Q624 R023

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	RWC
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PTC 2003-1014

Japan, Kokai

57-115493

ANTIOXIDANT FOR LUBRICANT

[Junkatsuyu Yo Sankaboshizai]

Tamaki Ishii

UNITED STATES PATENT AND TRADEMARK OFFICE

Washington, D.C.

December, 2002

Translated by: Schreiber Translations, Inc.

Country : Japan
Document No. : 57-115493
Document type : Kokai
Language : Japanese
Inventor : Tamaki Ishii
Applicant : Sumitomo Chemical Co., Ltd.
IPC : C 10 M 1/28
C 09 K 15/30
Application date : January 5, 1981
Publication date : July 17, 1982
Foreign Language Title : Junkatsuyu Yo Sankaboshizai
English Title : ANTIOXIDANT FOR LUBRICANT

1. Title of the Invention: ANTIOXIDANT FOR LUBRICANT

2. Claim

An antioxidant for a lubricant composed of a 2,2,4-trimethyl-1,2-dihydroquinoline polymer containing 5 wt% or more dimer component and less than 10 wt% monomer component.

3. Detailed explanation of the invention

The present invention pertains to an antioxidant for preventing the degradation of a lubricant due to the oxidation.

In general, in case a mineral lubricant and a synthetic lubricant are used, various additives are added to improve the characteristics.

In particular, in order to improve the oxidation stability of industrial lubricants such as hydraulic oil and turbine oil, internal combustion engines such as engine oil and gear oil, and metal processing oils such as rolling oil and cutting oil being exposed to a high temperature in the presence of an air, antioxidants are added to these oils.

In order to improve the oxidation stability, various antioxidants, for example, aromatic amines such as dioctyldiphenylamine, phenothiazine, and N,N'-di-secondary-butyl-paraphenylenediamine, hindered phenols such as 2,6-di-tertiary-

* Numbers in the margin indicate pagination in the foreign text.

butyl-paracresol, 4,4'-bis- 2,6-diisopropylphenol , and 4,4'-methylene bis- 2,6-di-tertiary-butylphenol, metal salts such as antimony diamyl dithiocarbamate and zinc diamyl dithiophosphate have been proposed and used. However, it cannot be said that any of these antioxidants has satisfactory performances, and along with the recent tendency of high-performance, especially long-life lubricants, the development of antioxidants having excellent performances for preventing the oxidation has been strongly in demand.

For this reason, this inventor earnestly reviewed high-performance antioxidants for lubricants, and as a result, it was discovered that if a 2,2,4-trimethyl-1,2-dihydroquinoline polymer (hereinafter, called RD polymer) with a certain specific composition was added to the lubricants, surprisingly, a high antioxidant performance, which could not be expected from the prior arts, was exerted. Then, the present invention was achieved. /2

In other words, the present invention provides a high-performance antioxidant for a lubricant composed of a RD polymer containing 5 wt% or more, preferably 25 wt% or more, and more preferably 50 wt% or more dimer component and less than 10 wt% monomer component.

The RD polymer of the present invention is a reaction product mainly composed of 2,2,4-trimethyl-1,2-dihydroquinoline monomer (hereinafter, RD monomer), dimer (hereinafter, RD dimer), and trimer (hereinafter, RD trimer) being obtained from aniline

and acetones such as acetone or diacetone alcohol or mesityl oxide, and the content of the RD monomer and the RD trimer of the present invention shows the content ratio of each compound in this reaction mixture. Needless to say, in the present invention, a single RD dimer in which the RD monomer and other high-molecular substances are removed from these reaction mixture is also included.

Also, in the RD polymer composition in the present invention, since the RD monomer has a slight evaporability, the addition to lubricants being exposed to a high temperature is not considerably preferable. 10 wt% or less is appropriate, and since the RD trimer or higher high-molecular substances tend to be slightly inferior in the solubility in lubricants, the amount being added to the lubricants is appropriately to the degree exhibiting no insolubility in the lubricants.

Therefore, a larger RD dimer content is preferable in terms of evaporability and solubility in lubricants. In terms of antioxidant performance of this purpose, the RD dimer is 5 wt% or more, preferably 25 wt% or more, and more preferably 50 wt% or less.

There is no particular limitation in the lubricants to which the present invention is applied. For example, synthetic oils and mineral oils based on mono- and/or dicarboxylic acid ester can be used, and the lubricants based on the mineral oils are appropriate.

The amount of antioxidant of the present invention being

added can be changed in a wide range in accordance with the kind of lubricants, operation conditions, etc., however the amount is generally in a range of 0.1-10 wt% to the lubricants.

The antioxidant of the present invention may be used in combination with conventional well-known antioxidants such as other amine group antioxidants, phenol group antioxidants, and zinc diamyl dithiophosphate, and in order to improve the performances to some extent, additives such as antiwear agent, anticorrosive agent, viscosity index enhancer, pour point depressant, cleaning dispersant, and extreme-pressure agent can also be used in combination.

Next, the present invention is explained in detail by application examples.

Application Example 1

According to the rotary pump oil oxidation testing method of ASTM-D-2272, 50 g lubricant provided for testing to which various antioxidants shown in Table I were added, 5 ml distilled water, and a copper [illegible] as a catalyst (dried after gloss-polishing and washing with ethyl ether) were put into a glass container and oxidized in an oxygen atmosphere.

The glass container was put into a stainless steel container connected to a pressure recording gauge, and the container was axially rotated at an angle of 30° to the horizontal state and at 100 rotations/min in an oil bath at 150°C .

The initial oxygen pressure before heating was adjusted to about 7 kg/cm², and a pressure rise was recognized as heating was

advanced. Then, it was constantly held until the oxidation started. The time at which the pressure was dropped by 2.0 kg/cm² was assumed as an oxygen absorption induction period and recorded by minutes.

The results were shown in Table II. Also, the lubricant used was Neutral Oil #200 of Daikyo Petroleum product.

Table I

/3

表 - 1

1)

2) 添加剤		酸化防止剤		
		8) (RDポリマー質量組成比) ※1		
		RDモノマー	RDダイマー	RDトリマーその他反応生成物
3) 施	1	1 5)	96 6)	3 7)
	2	4	32	44
	3	3	36	61
4) 例	4	2	18	80
	5	4	8	63
	6	21	14	65
4) 比	7	2, 6-ジ-第三ブチル-4-メチルフェノール ※2		
	8	4, 4'-メチレンビス-(2, 6-ジ-第三ブチルフェノール) ※3		
	9	フェニル-α-ナフチルアミン 9) ※4		
	10	4, 4'-ジ-第三オクチルジフェニルアミン ※5		

※1 ①C法により求めた値。なおRDモノマー、RDダイマーは質量分析及び核磁気共鳴分析によりその構造を確認した。

※2 Sumilizer BHT (住友化学社品)

※3 Ethyl 702 (Ethyl Corp社品)

※4 Antigene PA (住友化学社品)

※5 Vanluve 81 (Vanderbilt社品)

KEY TO TABLE 1.

1. Antioxidant
2. Additive No.
3. Application Example
4. Comparative Example
5. RD monomer
6. RD dimer
7. RD trimer and other reaction products
8. (RD polymer mass composition ratio) *1
9. 2,6-di-tertiary butyl-4-methylphenol *2
- 4,4'-methylene bis-(2,6-di-tertiary butylphenol) *3
- Phenyl- α -naphthylamine *4
- 4,4'-di-tertiary octyldiphenylamine *5

*1 Value attained by GC method. Also, the structures of RD monomer and RD dimer were confirmed by a mass spectrometry and a nucleomagnetic resonance spectrometry.

*2 Sumiliger BHT (product made by Sumitomo Chemical Co. Ltd.)

*3 Ethyl 702 (product made by Ethyl Corp Co.)

*4 Antigene PA (product by Sumitomo Chemical Co., Ltd.)

*5 Vanluve 81 (product made by Vanderbilt Co.)

Table II

4)

表 - 2

2)

3)

5) -

6) -

	添加剂 名称	实 施 例					比 较 例					总 加
		1	2	3	4	5	6	7	8	9	10	
	0.2	985	882	625	423	411	292	106	97	305	96	57
	0.5	2510	2575	1931	1274	152	785	350	286	780	274	

代理人 丹理士 木村 昭哉

1. Application Example
2. Comparative Example
3. No addition
4. Additive No.
5. Amount added (%)
6. Oxygen absorption induction period (min)

19 日本国特許庁 (JP)

11 特許出願公開

12 公開特許公報 (A)

昭57-115493

5 Int. Cl.³

識別記号

庁内整理番号

43 公開 昭和57年(1982)7月17日

C 10 M 1.28

2115-411

C 09 K 15.30

7003-411

発明の数 1

審査請求 未請求

(全 3 頁)

54 潤滑油用酸化防止剤

吹田市内本町1丁目12番2号

71 出 願 人 住友化学工業株式会社

大阪市東区北浜5丁目15番地

21 特 願 昭56-612

22 出 願 昭56(1981)1月5日

74 代 理 人 弁理士 木村勝哉

72 発 明 者 石井玉樹

PTO 2003-1014

S.T.I.C. Translations Branch

明 細 書

1. 発明の名称

潤滑油用酸化防止剤

2. 特許請求の範囲

ダイマー成分を5重量%以上含有しかつモノマー成分がノド重量%未満である、 α 、 ω -タートリメチル^(1,2)-ジヒドロキノリン置換物からなる潤滑油用酸化防止剤

3. 発明の詳細な説明

本発明は潤滑油の酸化による劣化を防止する酸化防止剤に関する。

一般に鉱質潤滑油および合成潤滑油を使用する場合には、その特性を改良するために種々の添加剤が添加される。

特に空気の存在下で高温域にさらされる作動機、タービン機等の工業用潤滑油、エンジン油、ギヤ油等の内燃機関油および注圧油、切削油等の金属加工油等の酸化安定性を向上させるために酸化防止剤がこれらの油に添加される。

従来かかる酸化安定性を向上させるために、

例えばシオクタリジフェニルアミン、フェノチアジン、N、N'-ジ- α -ナフチル- β -ラフェニレンジアミン等の芳香族アミン類、 α 、 ω -ジ- α -ナフチル- β -クロレソール、 α 、 ω -ビス-(α 、 ω -ジイソプロピルフェノール)、 α 、 ω -メチレンビス-(α 、 ω -ジ- α -ナフチルフェノール)等のビンゲートフェノール類、アンチモンジアミルジチオカルバマート、亜鉛のシアミルジチオホスフェート等の金属塩類等の種々の酸化防止剤が提案され、使用されてきたが、これら酸化防止剤はいずれもまた満足すべき性能を有するとは見えず、近年の高度性、特に高度鉱質潤滑油指向の背景において、酸化防止に優れた性能を有する酸化防止剤の開発が強く望まれていた。

このようなことから本発明者は潤滑油用の高性能酸化防止剤を鋭意検討した結果、ある特定組成の α 、 ω -タートリメチル-、 ω -ジヒドロキノリン置換物(以下「ポリマー」)を潤滑油に添加した結果、従来と比較して著明

もできない驚くべき腐蝕防止性能をもたらすことを見い出し本発明に至った。

すなわち本発明はダイマー成分を5重量%以上好ましくは25重量%以上、更に好ましくは50重量%以上含有し、かつモノマー成分が10重量%未満であるHDポリマーからなる潤滑油用の高性能酸化防止剤を提供するものである。

本発明でのHDポリマーとは、例えばアニリンとアセトンあるいはジアセトンアルコールあるいはメシチルオキシド等のアセトン類から得られる主として2,2,4-トリメチル-1,2-ジヒドロキノリンモノマー（以下HDモノマー）、ダイマー（以下HDダイマー）及びトリマー（以下HDトリマー）等その他の高重合物からなる反応生成混合物物であって、本発明でいうHDモノマー、HDダイマーの含量とはかかる反応混合物物中におけるそれぞれの化合物の含有割合を示すものである。もちろん本発明においてはこれら反応生成物からHDモノマー、その他の高重合物等を除去したようなHDダイマー単独のような場合もある。

(3)

に潤滑油に対して0.1ないし10重量%の範囲である。

本発明の酸化防止剤は他のアミン系酸化防止剤、フェノール系酸化防止剤、亜鉛のジアルキルチオホスフェノート等の従来公知の酸化防止剤と併用しても良く、又ある種の性能特性を改善する目的で単独防止剤、腐蝕防止剤、粘着指数改善剤、流動点降下剤、清浄分散剤、酸化剤等の添加剤と併用することもある。

次に実施例によって本発明を具体的に説明する。

実施例1

ASTM-D-2272によるロータリーポンプ油酸化試験法に準じ、表1に示した種々の酸化防止剤を添加した供試潤滑油50gを蒸留ホウ酸及び触媒として銅線（先沢酸を洗ったエチルエーテルで洗淨後乾燥したもの）と一緒にガラス容器に入れ、酸素雰囲気中で酸化した。

ガラス容器は圧力記録計に連結したスタン

まれる。

又、本発明でのHDポリマー組成においてHDモノマーは融軟性を若干有するため高温下にさらされる潤滑油への添加はあまり好ましくなく、10重量%以下が適当であり、又HDトリマーあるいはそれ以上の高重合物は潤滑油に対する溶解性に若干劣る傾向にあるため潤滑油に添加される量において潤滑油への不溶性を示さない程度が適当である。

したがって、融軟性及び潤滑油への溶解性の面からHDダイマー含量は多い程好ましく、本発明の酸化防止剤の面からHDダイマーは5重量%以上、好ましくは25重量%以上、更に好ましくは50重量%以上である。

本発明に適用される潤滑油は特に制限なく、たとえばモノおよび/またはジカルボン酸のエステルに基づく合成油や鉱油であり得るが、特に鉱油に基づくものが通している。

本発明の酸化防止剤の添加量は潤滑油の種類、使用条件等により広範囲に変化し得るが、一般

(4)

レス鋼容器に入れ、容器は150℃の油浴中、100回転/分で水平に対して30°の角度で軸方向に回転させた。

加熱前の初期酸素圧は約7 kg/cm²に調整し加熱が適宜につれて圧力上昇が見られ、そして酸化開始までは一定に保たれる。圧力が2.0 kg/cm²だけ低下した時間を酸素吸収試験期とし分で記録した。

結果を表1に示した。なお使用した潤滑油は大崎石油品のニュートラルオイル200である。

表-1

試料番号	酸化防止剤		
	(RDポリマー無量組成比) ※1		
	HDモノマー	HDダイマー	RDトリマーその他成分生成物
1	1	96	3
2	4	52	44
3	3	36	61
4	2	18	80
5	4	8	88
6	21	14	65
7	2,6-ジ-tert-ブチル-4-メチルフェノール ※2		
8	4,4'-メチレンビス-(2,6-ジ-tert-ブチルフェノール) ※3		
9	フェニル-α-ナフチルアミン ※4		
10	4,4'-ジ-tert-ブチル-2,2'-ジフェニルアミン ※5		

※1 G.C法により求めた値。なおHDモノマー、

HDダイマーは質量分析及び核磁気共鳴分

析によりその構造を確認した。

※2 Sumilizer BHT (住友化学社品)

※3 Ethyl 702 (Ethyl Corp社品)

※4 Antigene PA (住友化学社品)

※5 Vanluve 87 (Vanderbilt社品)

(7)

表-2

試料番号	実施例					比較例					無添加
	1	2	3	4	5	6	7	8	9	10	
酸化防止剤	0.2	98.5	88.2	62.5	42.3	41.1	29.2	10.6	9.7	30.5	9.6
重量%	0.5	2510	257.5	193.1	127.4	152	78.5	35.0	28.6	78.0	27.4

代理人 丹理士 木村 啓 哉

(8 完)